Automated Test Case Generation from Highly Reliable System Requirements Models, Phase II

Completed Technology Project (2009 - 2011)

Project Introduction

Software testing is a complex and expensive phase of the software development cycle. Effective software testing is especially important in mission-critical software, where erroneous behavior poses a risk to safety or mission success. Automated test case generation can make testing more efficient and effective, saving resources and reducing risk. Under Phase 1, Safeware Engineering Corporation successfully developed the algorithms necessary to streamline software testing by automatically generating test cases directly from SpecTRM-RL models. SpecTRM-RL (Specification Tools and Requirements Methodology -- Requirements Language) is a requirements language that was designed to be highly readable, allowing even non-specialists to understand them, but is also completely formal. Test cases generated from the black-box models written in SpecTRM-RL will focus on the intended behavior of the system. The test case generation tool will be designed to allow the user to choose between a smaller set of test cases, allowing for more rapid error identification, and a larger set providing more comprehensive coverage. The phase II effort will implement these algorithms, adding test-case generation to SpecTRM, the tool suite which allows for editing, analysis and execution of SpecTRM-RL models. The new test case generation tools will be tested on the Max Launch Abort System.

Primary U.S. Work Locations and Key Partners
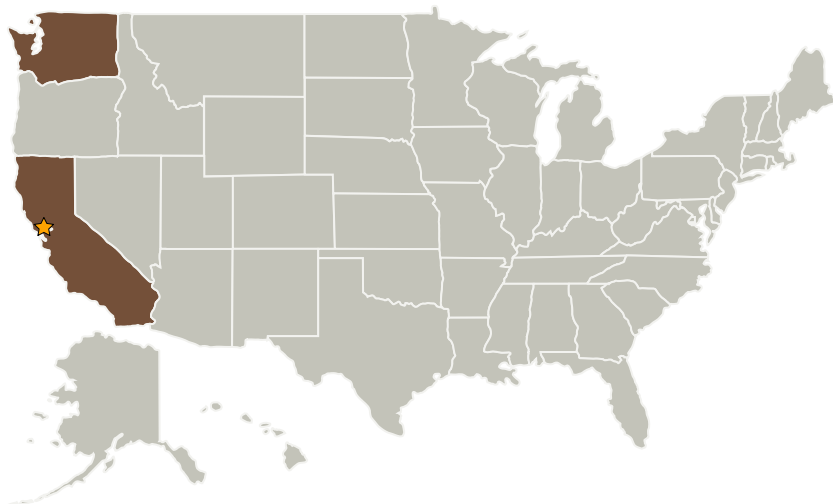
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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Organizations Performing Work	Role	Type	Location
⭐Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Safeware Engineering Corporation	Supporting Organization	Industry	Seattle, Washington

Primary U.S. Work Locations	
California	Washington

Project Transitions

▶ **November 2009:** Project Start

✔ **October 2011:** Closed out

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  └ TX11.1 Software Development, Engineering, and Integrity
    └ TX11.1.2 Verification and Validation of Software systems